Dec. 7, 1926. 1,609,497

E. SCHOETTEL

AIRSHIP

Filed July 17, 1925

Fig. 1.

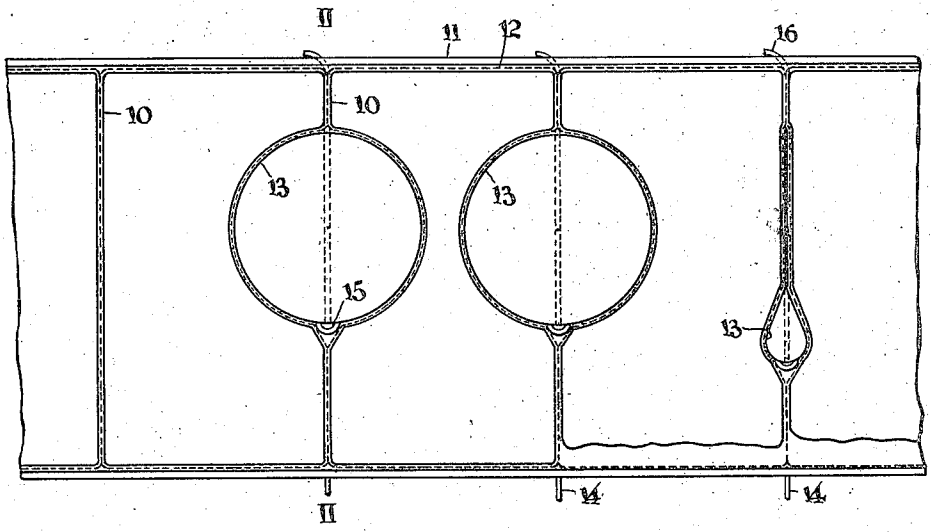
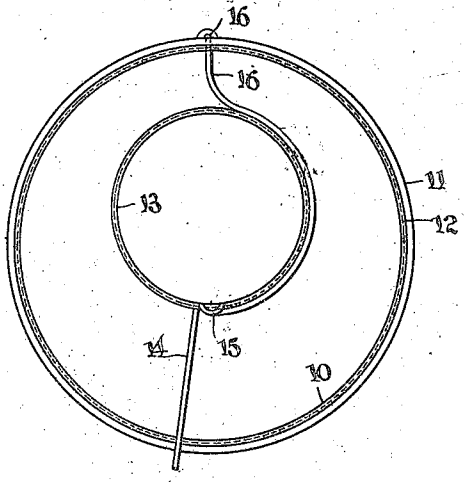


Fig. 2.



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UNITED STATES PATENT OFFICE.

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AIRSHIP.

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My invention relates to air ships and it has particular relation to a structure and arrangement of gas compartments within the envelope or hull of a dirigible airship.

One object of my invention is to provide an airship in which both non-inflammable and inflammable gases may be utilized as mediums of lifting power, and in which the gas containers or compartments are so constructed that the non-inflammable gas forms a protecting wall about the inflammable gas container, thereby reducing the danger of explosion of the inflammable gas to a minimum.

Another object of my invention is to provide an airship in which non-inflammable gas is utilized as the principal lifting medium and in which inflammable explosive fuel gas is utilized as a supplemental lifting medium, the gases being so confined and distributed that the airship may be maneuvered without loss of any of the non-inflammable gas.

Airships have heretofore been constructed wherein gas containers have been inflated with non-inflammable gas. Other containers inflated with inflammable maneuvering gas have been disposed wholly within the first named containers and surrounded by the non-inflammable gas. However, these structures and arrangements previously employed are disadvantageous in many respects, for example, difficulties invariably arise in properly positioning gas containers for relatively light inflammable maneuvering gas within the non-inflammable gas containers. In order to valve the inflammable gas or to replenish the supply thereof, a gas conduit must pass through the wall of the outer gas container. This is objectionable because the securing means is likely to injure the gas bags during inflation or deflation thereof. There is also difficulty encountered in manipulating the valves of such inclosed inflatable gas containers. In the event that the containers are pierced or in case the inner container becomes damaged and it leaks, the light inflammable gas will escape into and rise to the top of the outer or non-inflammable gas container displacing the heavier non-inflammable gas. Thus, it is obvious that the inflammable gas will rise to one location in the outer container, such concentration of the combustible gas resulting in impairing the safety of the airship. Also, by having one container completely disposed within another, it is difficult to detect a leak in the inner container and thus danger of explosion may be prolonged and the existence of such danger will likely be unknown until the actual explosion occurs.

By my invention I have avoided all of the disadvantages above enumerated and yet I have retained the advantages of utilizing a principal lifting gas, which is non-inflammable, and an inflammable maneuvering gas. An airship embodying my invention consists generally of an envelope inclosing a plurality of substantially cylindrical gas containers conforming to the contour of the envelope and positioned in abutting relation to each other. These containers are inflated with a non-inflammable lifting gas such as helium. Separate relatively smaller gas containers inflated with inflammable lifting gas are positioned between the several larger containers and are inclosed thereby. Gas conduits lead from the small containers to the atmosphere and in case fuel gas is employed, a conduit is provided which communicates with a power motor.

For a better understanding of my invention, reference may now be had to the accompanying drawings forming a part of this specification, of which:

Fig. 1 is a fragmentary longitudinal cross-sectional view of an airship illustrating diagrammatically an arrangement of gas containers constructed in accordance with my invention; and

Fig. 2 is a transverse cross-sectional view illustrating the relative positions of the different forms of gas containers employed in my invention, the view being taken substantially along the line II—II of Fig. 1.

In practising my invention I have provided a number of substantially cylindrical fabric gas containers 10 adapted to be inflated with non-inflammable gas such as helium and which are adapted to be disposed within an airship envelope or hull generally indicated by the numeral 11. It is to be understood that the containers 10 are not necessarily cylindrical in form but they may assume any commonly known shape of gas containers employed in lighter-than-aircraft. Each of the containers 10 is completely inclosed by a netting 12 which ex-

tends between the abutting ends of the containers and is secured in any suitable manner to the envelope or hull 11.

It is well known that the scarcity and expensiveness of helium renders it desirable to conserve this gas as much as possible. With this end in view, I have provided supplemental gas containers 13 which are deflated or inflated for the purpose of maneuvering the airship.

These supplemental gas bags or containers 13 are of relatively smaller size and they are positioned between and enveloped by the adjacent ends of the larger containers 10. The netting 12 serves the purpose of inclosing the gas containers 13 and limits the expansion thereof. The netting also serves the purpose of properly positioning the gas containers 13 with respect to the compartments 10 and to the airship hull or envelope. The containers 13 are adapted to be inflated with relatively inexpensive inflatable lifting gas or with fuel gas. In case fuel gas is employed a conduit 14 is provided which communicates with a motor (not shown). The conduit 14 may also be used for inflating the cell 13, or, if desired, an additional conduit may be provided for that purpose. At the right-hand side of Fig. 1 I have shown the inner bag 13 substantially deflated.

At the bottom of each of the containers 13, a gas valve 15, of standard construction, is provided which communicates with a conduit 16 leading from the container through the top of the airship to the free air. The lifting power of the airship may be varied by valving the combustible gas by means of the valve 15 without loss of any of the helium or like gas with which the containers 10 are inflated.

Ordinarily the containers 13 will be filled with a fuel gas, such as methane, more commonly known as coal gas, which, although it has considerable lifting power, is nevertheless heavier than helium. By reason of the fact that the containers 13 and 10 are separately constructed, any gas which escapes from the container 13 becomes lodged between the wall of the container 13 and the adjacent wall of the container 10. As the helium is lighter in weight than the methane, the methane is forced downwardly thereby, between the walls of the container 13 and the cell 10 until it reaches the lowermost point of the container 13, and there passes into the conduit 16 which also communicates with the valve 15. Thus any gas which escapes from the gas cell 13 is discharged into the air rather than being permitted to form a pocket of explosive gas between the cells 13 and 10.

As indicated above, the gas in the containers 13 may be used only for navigation purposes or it may be utilized as a motor fuel. In the latter case, liquid fuel such as gasoline may be saved and at the same time the increased lift caused by consumption of gasoline will be avoided. Consequently, the amount of water necessary to recover by the ballast water recovery method is reduced to a minimum or dispensed with altogether.

Although I have illustrated but one form which my invention may assume and have described in detail but a single application thereof, it will be apparent to those skilled in the art that it is not so limited but that various minor modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

What I claim is:

1. An airship comprising a plurality of gas containers arranged in series, the adjacent gas containers engaging each other, and a plurality of smaller gas bags engaging adjacent gas containers, said smaller bags being disposed between and surrounded by the adjacent gas containers.

2. An airship comprising a plurality of lifting gas containers, fuel gas containers disposed centrally of the airship and means for supporting fuel gas containers intermediate the lifting gas containers, the lifting gas containers engaging the fuel gas containers in inclosing relationship.

3. An airship comprising a plurality of containers adapted to receive non-inflammable lifting gas therein, a plurality of containers adapted to receive inflammable fuel gas, the latter containers, being surrounded and engaged by the first named containers, and a netting enveloping each of the containers.

4. An airship comprising a plurality of fluid containers arranged in abutting relationship to each other, a relatively smaller fuel gas container positioned between and surrounded by the abutting portions of the fluid containers, and a motor supply conduit extending outwardly from the fuel gas container between the fluid containers.

5. An airship comprising a plurality of fluid containers arranged in abutting relationship to each other, relatively smaller fuel gas containers positioned between and surrounded by the abutting portions of the fluid containers, a motor supply conduit connected to each fuel gas container, and means for permitting the gas in the fuel gas containers to escape to the atmosphere.

6. An airship comprising a plurality of separate flexible gas containers disposed in abutting engagement, and an independent flexible gas cell disposed intermediate two of said containers and completely enveloped thereby.

7. An airship comprising a plurality of separate flexible gas containers disposed in abutting engagement, an independent flexi-

ble gas cell disposed intermediate said containers and completely enveloped thereby, and means for causing the escape into the atmosphere of any gas leaking from said last mentioned cell.

8. An airship comprising a plurality of separate flexible gas containers disposed in abutting engagement, an independent flexible gas cell disposed intermediate said containers and completely enveloped thereby, means for permitting the escapement of gas from said intermediately disposed cell into the atmosphere, and means for causing the escape into the atmosphere of any gas which leaks from said intermediate cell.

In witness whereof, I have hereunto signed my name.

EUGEN SCHOETTEL.